

CP348

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 CP348 – USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue
1.0	Initial version	2021-Nov-16
1.1	Compliance update and Table 3 update with °F and ft. measurements	2022-Jan-20
1.2	Compliance CISPR 22 changed to CISPR 11	2022-Jan-25

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Symbols

The following symbols may be used in this user guide.

▲ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

▲ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

NOTICE indicates a property damage message.

▲ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.



Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

This symbol informs of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.



This symbol indicates general information about the product and the user guide.
This symbol indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠ CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

⚠ CAUTION



Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

⚠ CAUTION

Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Follow the "General Safety Instructions for IT Equipment" supplied with the product.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠ CAUTION

Danger of explosion if the battery is replaced incorrectly.

- ▶ Replace only with same or equivalent battery type recommended by the manufacturer.
 - ▶ Dispose of used batteries according to the manufacturer's instructions.
-

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product, then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit <http://www.kontron.com/about-kontron/corporate-responsibility/quality-management>.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- ▶ Reduce waste arising from electrical and electronic equipment (EEE)
- ▶ Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- ▶ Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- ▶ Improve the environmental performance of all those involved during the lifecycle of EEE



Environmental protection is a high priority with Kontron.
Kontron follows the WEEE directive.

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1/ Introduction

1.1. Board Overview

The CP348 CompactPCI to serial interface board is a 3U CompactPCI (CPCI) board implementing the Exar/Max Linear XR17V354 four-channel PCIe to serial controller and the Pericom PI7C9X111SL PCIe to PCI reversible bridge.

The 37-pin D-Sub serial I/O connector on the CP348's front panel, provides four serial I/O channels, where each channel is individually programmable to support RS232, RS422 or RS485. Four pairs of LEDs on the CP348's front panel indicate the receive and transmit data transfer operations.

The CP348 is galvanic isolated between the CPCI system side and the serial I/O front panel 37-pin D-Sub connector for all four channels. To provide separate serial I/O channeling, it is possible to connect a front panel adapter to the 37-pin D-Sub connector on the front panel. This adapter terminates on the user side with four male 9-pin D-Sub connectors, one per serial I/O channel.

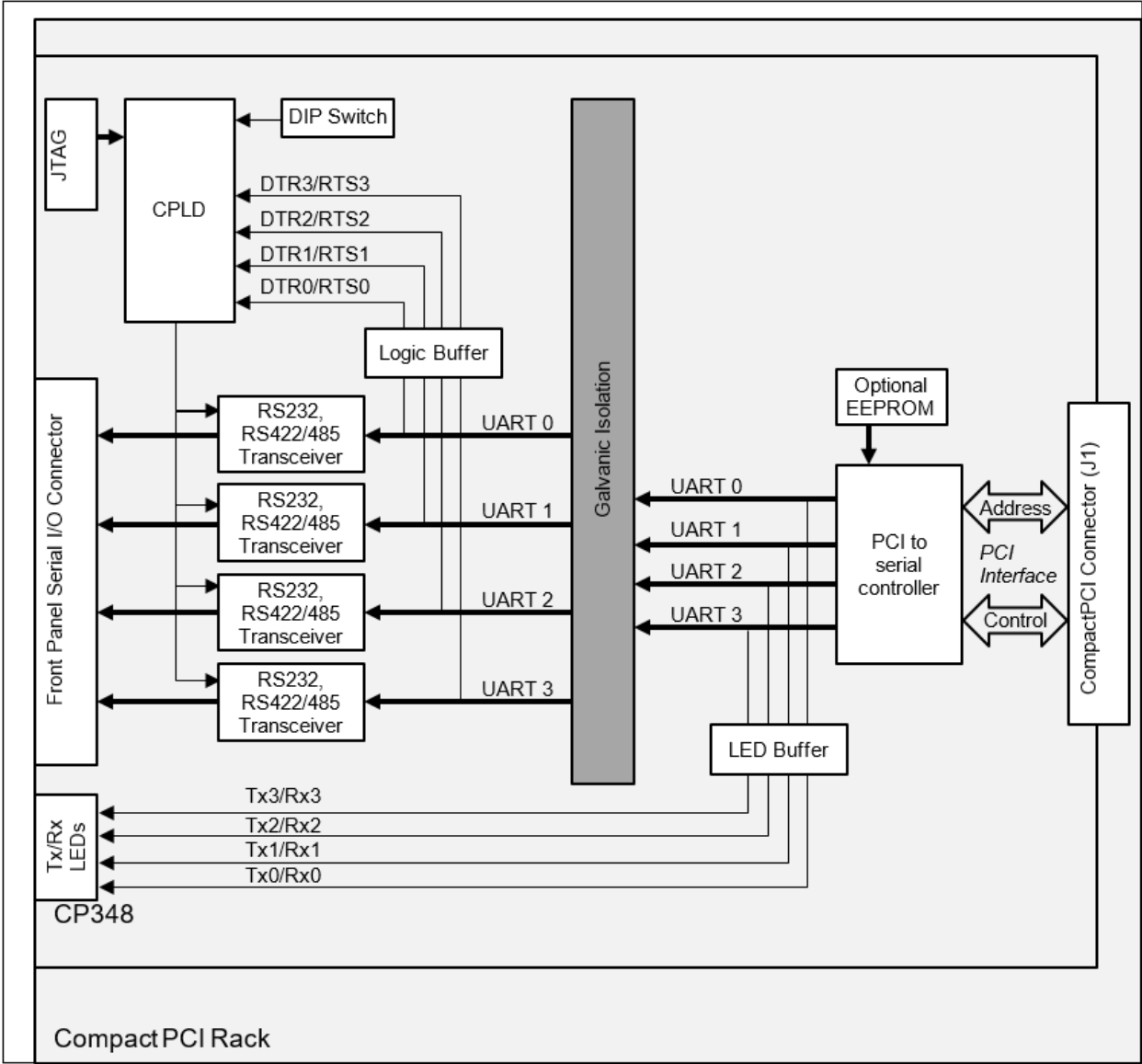
The CP348 CompactPCI to serial interface board is offered with various Board Support Packages (BSPs) including Windows®, Linux® and VxWorks® operating systems. For further information concerning the operating systems available for the CP348, contact [Kontron Support](#).

Basic CP348 features are:

- ▶ 3U standard CompactPCI board form factor
- ▶ High performance quad UART XR17V354
- ▶ 32-bit PCI address and data bus
- ▶ 33 MHz or 66 MHz PCI system clock
- ▶ UART data rates of up to 115.2 kbps
- ▶ Isolated (up to 2 kV between CompactPCI system and D-Sub connector)
- ▶ Four independent and individually configurable serial channels
- ▶ RS232, RS422, and RS485 standards
- ▶ Hardware selectable bus termination resistors (RS422/RS485)
- ▶ One 37-pin dual-row D-Sub connector
- ▶ Front panel Rx/Tx control LEDs
- ▶ Windows®, Linux® and VxWorks® support

1.2. Board Diagrams

Figure 1: CP348 Functional Block Diagram



1.2.1. Front Panel

Figure 2: CP348 Front Panel



1. Front Panel LEDs

Eight front panel indicator LEDs, two LEDs for each of the four channels:

- ▶ 4x yellow LEDs for Rx (receive)
- ▶ 4x green LEDs for Tx (transmit)

2. Front Panel Serial I/O Connector

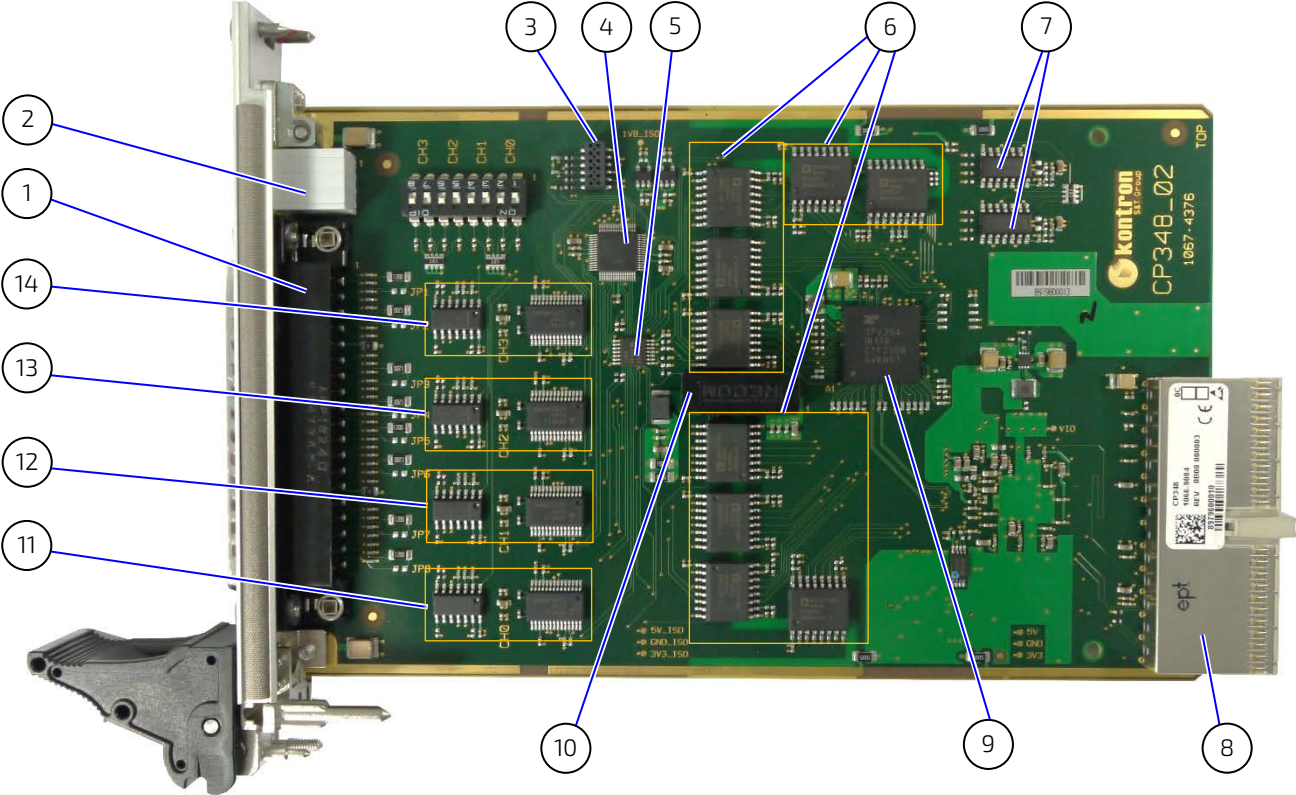
37-pin D-Sub connector contains signals for four serial interfaces configured individually as RS232, RS422 or RS485. For the pin assignment, see Chapter 2.3.1: Front Panel Serial I/O Connector.

1.2.1.1. Front Panel Adapter

The four-channel front panel adapter cable (CP-ADAP-CP34X) connects to the front panel's 37-pin D-Sub connector to provide discrete access to the separate serial I/O channels and terminates on the user side with four separate male 9-pin D-Sub connectors, (one 9-pin D-Sub connector per serial I/O channel). For more information, see Chapter 4.4.1: Four-Channel Front Panel Adapter cable.

1.2.2. Board Layout

Figure 3: CP348 Connector and Main Components (top side)



- 1 37-pin D-Sub front panel connector
- 2 8x Front panel indicator LEDs
- 3 12-pin JTAG/ISP connector
- 4 CPLD
- 5 Voltage translator
- 6 9x Digital isolator
- 7 LED buffer to activate Tx and Rx front panel LEDs
- 8 CompactPCI connector J1
- 9 4-channel PCIe to serial controller
- 10 Voltage isolation
- 11 2x RSxxx transceiver channel 0
- 12 2x RSxxx transceiver channel 1
- 13 2x RSxxx transceiver channel 2
- 14 2x RSxxx transceiver channel 3

Figure 4: CP348 Configurable Components (top side)

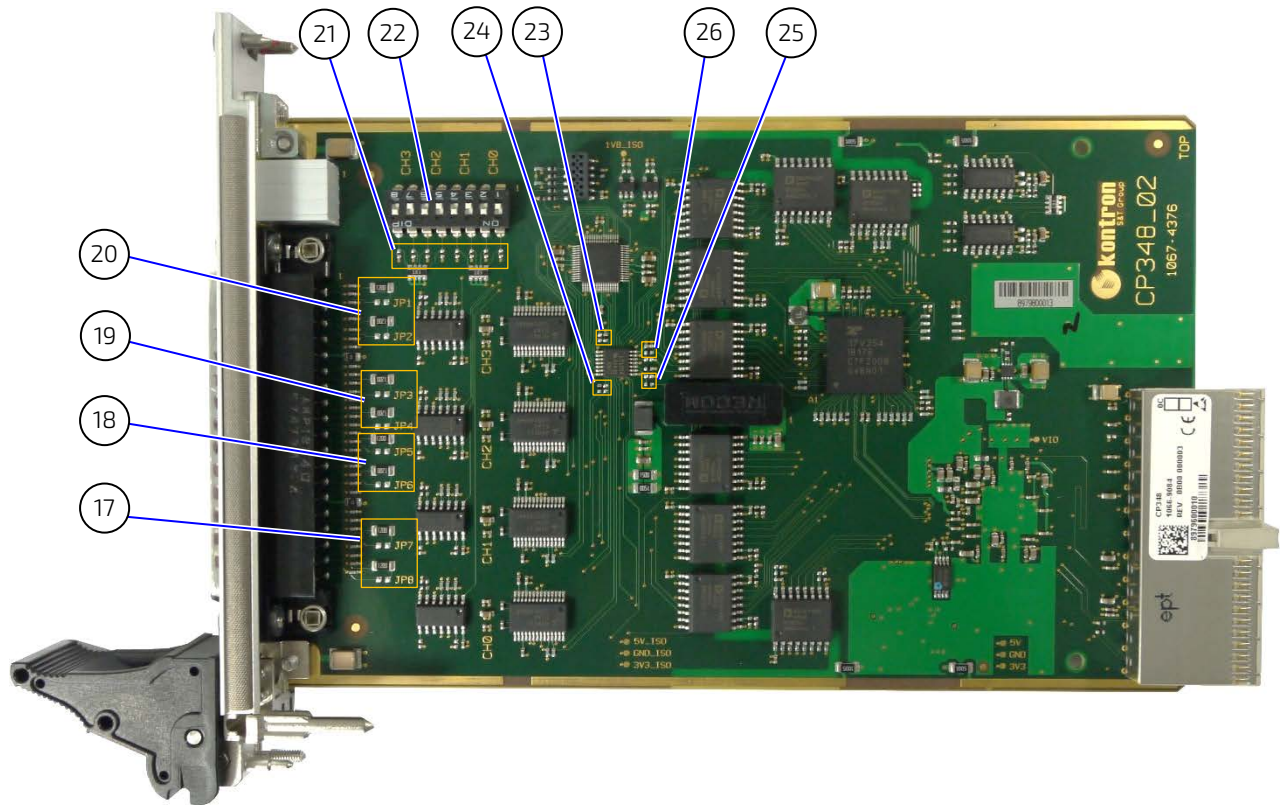


Table 1: CP348 Configurable Components (top side)

Item	Component	Channel #	Description
17	JP7, JP8	Channel 0	Bus termination solder-jumpers, sets RS422 /485 mode (Jumpers JP1 to JP 8 Listed on-board from top to bottom)
18	JP5, JP6	Channel 1	
19	JP3, JP4	Channel 2	
20	JP1, JP2	Channel 3	
21	R35, R34	Channel 0	0 Ω resistors serial mode configuration (Resistors R35 to R28 listed on-board from rear to front panel)
	R33, R32	Channel 1	
	R31, R30	Channel 2	
	R29, R28	Channel 3	
22	Port 1, Port 2	Channel 0	8-port DIP switch(SW1) for serial mode configuration (Port numbers 1 to 8 listed from rear to front panel)
	Port 3, Port 4	Channel 1	
	Port 5, Port 6	Channel 2	
	Port 7, Port 8	Channel 3	
23	R58, R59	Channel 0	2x 0 Ω resistors to configure CPLD RTS# or DTR# inputs (Resistor pairs R58, R59 & R81, R82 listed from front panel to rear) (Resistor pairs R76, R83 & R64, R73 listed from top to bottom)
24	R81, R82	Channel 1	
25	R76, R83	Channel 2	
26	R64, R73	Channel 3	

1.3. Technical Specification

Table 2: CP348 Technical Specifications

Form Factor	
Form Factor	3U CompactPCI board
Dimensions	3U/4TE, 100 mm x 160 mm (3,94" x 6.3") single height)
Weight	148 gram (0.35 pounds)
Controller	
PCIe to Serial Interface	Exar XR17V354, four-channel UART PCIe port to external serial interface bridge
CPLD	Altera 5M40ZE64I5N CPLD, switches the RS232/RS422/RS485 transceivers On/Off, as defined in the user configuration
System Interconnection	
Serial I/O Interface channels	4x channels, individually configurable using hardware and/or software
Serial I/O interface channel Modes	RS232, RS422 full duplex RS485 half duplex (with or without local Echo)
RS422/485	120 Ω termination options for RS422/RS485 with solder jumpers)
Serial Data Rates	Up to 115.2 kbps
Programmable Data Formats	Up to 256-byte transmit and receive FIFOs 16550 compatible register set Automatic RTS/CTS or DTR/DSR hardware flow control Automatic Xon/Xoff software flow control Automatic RS485 half duplex direction control
PCI	
PCI to PCIe	Pericom PI7C9X111SL Reversible PCI/PCIe bridge, for CPCI to PCIe translation
CompactPCI	32-bit address/data bus, 33 MHz/66 MHz clock
Front Panel	
External Board Interfaces	1x 37-pin D-Sub
LEDs	8x Indicator LEDs (two for each channel): ▶ 4x yellow Rx ▶ 4x green Tx
Power Considerations	
Power Supply	5 V and 3.3 V (+12 V/-12 V not required)
Isolation Voltage	2 kV between CompactPCI system and D-Sub front panel
Overvoltage Protection	RSxxx transceiver I/O(s) can handle ± 12 V
PCI Interface	3.3 V and 5 V V(I/O) signaling voltage
Power Consumption	< 0.45 Watt (typical condition)
Software	
Operating systems	Drivers are supplied for the operating systems: ▶ Windows® ▶ Linux® ▶ VxWorks®

1.4. Environmental Considerations

Table 3: Environmental Specification

Environmental Specification		
Operating Temperature (Standard range)	0°C to +70°C (+32°F to +158°F)	
	<div style="border: 1px solid black; padding: 5px;"> <p>NOTICE In a passive cooled system, the maximum ambient temperature is +48°C (118.4°F).</p> </div>	
Operating Temperature (Extended range 'E2')	-40°C to +85°C (-40°F to 185°F)	
	<div style="border: 1px solid black; padding: 5px;"> <p>NOTICE In a passive cooled system, the maximum ambient temperature is +63 °C (145.4°F).</p> </div>	
Storage Temperature	-55 °C to +125 °C (-67°F to +257°F)	
Thermal Operation	IEC 60068-2-1	Environmental testing - Cold
	IEC 60068-2-2	Environmental testing - Dry heat
Humidity	IEC 60068-2-78	Environmental testing - Damp heat, steady state
	93 % RH non-condensing	
Vibration	IEC 60068-2-6	Sinusoidal, 10 Hz to 300 Hz, 5 g
Random Vibration	IEC 60068-2-64	20 Hz to 500 Hz or 500 Hz to 2000 Hz, 3.6 g
Bump	IEC 60068-2-29	Half sine. 11 ms, 15 g
Shock	IEC 60068-2-27	Half sine. 9 ms, 30 g
Operating Altitude	Up to 2000 m (6561.68 ft.)	

NOTICE

The difference between ambient temperature and the temperature inside the system must be considered.

NOTICE

Forced air-cooling is required and must be considered in the system.

NOTICE

If operated in a dust-prone environment, an air filter must be considered for dust protection.

1.5. Compliance

The CP348 complies with the relevant requirements and the approximation of the laws relating to the CE (Conformité Européenne) Mark, and the standards that are constitutional parts of the declaration.

Table 4: Compliance


Europe – CE Mark		
Directives	2014/30/EU: Electromagnetic Compatibility 2014/35/EU: Low Voltage 2011/65/EU: RoHS II 2001/95/EC: General Safety of Products	
EMC	EN 55011 Information technology equipment - Radio disturbance characteristics- Limits and methods of measurement (CISPR 11) EN 61000-6-3 Electromagnetic compatibility (EMC) - Part 6-3 Generic standards – Emission for residential, commercial and light industrial environments EN 61000-6-2 Electromagnetic compatibility (EMC) - Generic standard – Immunity for industrial environmental	
Safety	EN 61010-1 Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General Requirements	

Table 5: Country Compliance

USA/CANADA		
Safety	UL 61010-1 CAN/CSA-22.2 No. 61010-1 (design to meet) Audio/video, information and communication technology equipment - Part 1: Safety requirements	



If the product is modified, the prerequisites for specific approvals may no longer apply.



Kontron is not responsible for any radio television interference caused by unauthorized modifications of the delivered product or the substitution or attachment of connecting cables and equipment other than those specified by Kontron. The correction of interference caused by unauthorized modification, substitution or attachment is the user's responsibility.

1.6. Power Requirements

The CP348's is compatible with both CompactPCI backplane voltages, and can be operated using either 5 V V(I/O) or 3.3 V VIO from the CPCI interface pins. The standard supply voltages are 5 V and 3.3 V DC. On board DC/DC voltage isolators, isolate serial channels from the CompactPCI interface.



The CP348's universal CPCI interface is compatible with both CPCI backplane voltages and can operate properly using 5 V and 3.3 V PCI V (I/O) signaling.

1.7. Related Publications

For more information regarding CompactPCI, refer to the [PICMG 2.0 Rev 3.0 CompactPCI Standard](#).

2/ Functional Description

2.1. General Information

The CP348 serial interface board is a low cost solution for industrial automation communication purposes requiring a serial communication controller board at the basic OSI levels.

The main functions implemented on the CP348 serial interface board are the OSI Layer 2 data link control for RS232, RS422 and RS485 communication purposes, and the OSI Layer 1 physical signal level adaptation for the RS232, RS422 and RS485 interfaces. The RS422 interface is full duplex (4-wire) and the RS485 interface is half duplex (2-wire).

The physical layer adaptation (OSI Layer 1) of the TTL interface signals is realized independently for each channel via the corresponding on-board RS232, RS422, RS485 transceivers. Each of the four serial communication links are configured individually for serial interface operation using hardware and software, including the serial line termination for balanced serial communication.

2.2. Specifics

The four-channel PCI to serial controller (Exar, XR17V354) handles the OSI Layer 2 functions serial communication tasks.

The four serial I/O channels are independent allowing for individual RS232, RS422 or RS485 configuration. For the various operation types, configuration of the serial communication links as well as serial line termination for differential communication (RS422/RS485) is accomplished using hardware and software.

The communication functions including the RS232, RS422 and RS485 serial I/O functions are tied to the host system via the standard PCI interface. The CP348 serial communication operation and logical control is accomplished via the PCIe to serial controller's command and status registers that can be accessed independently for each channel directly from the PCI side.

The CP348 is galvanic isolated between the system side and the front panel connector using DC/DC converters and digital isolator on all four serial interface channels. This is especially useful in industrial environments, where voltage potential differences between the different transmission stations can occur. Using this technology GND compensating currents can be avoided or minimized, while protecting against noise transients on the system side, where expensive components such as CPU are located.

2.3. Board Interfaces

The CP348 compact PCI to serial interface board's 37-pin D-Sub front panel connector provides the signals for all four serial I/O channels. To provide separate serial I/O channeling, a front panel adapter can be connected to the 37-pin D-sub front panel connector. The front panel adapter terminates on the user side with four, male, 9-pin, D-Sub connectors (one connector per serial I/O channel).

The serial channel's data transfer is indicated on the front panel by four LEDs with one receive and one transmit LED per channel.

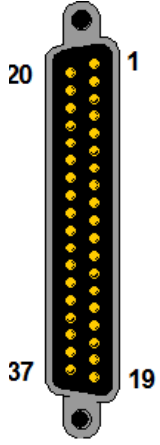
2.3.1. Front Panel Serial I/O Connector

The front panel serial I/O, 37-pin D-Sub dual row, connector comprises of the signals for channels 0 to 3.

NOTICE

Do not connect external wiring to the connector pins not indication or labeled with NC.
Failure to comply may result in damage to your board.

Table 6: 37-Pin D-Sub Front Panel Connector Pin Assignment

Channel	Signal Front Panel	Pin #	Direction	RS232	RS485 Half Duplex	RS422 Full Duplex	Front Panel 37-Pin D-Sub Connector
0	FE01	37		DCD		RxD+	
	FE02	36	In	RXD#			
	FE03	35	Out	TXD#	TRxD+	TxD+	
	FE04	34		DTR			
	FE06	18		DSR		RxD-	
	FE07	17	Out	RTS			
	FE08	16	In	CTS	TRxD-	TxD-	
	FE09	15		RI			
1	FE11	10		DCD		RxD+	
	FE12	11	In	RXD#			
	FE13	12	Out	TXD#	TRxD+	TxD+	
	FE14	13		DTR			
	FE16	29		DSR		RxD-	
	FE17	30	Out	RTS			
	FE18	31	In	CTS	TRxD-	TxD-	
	FE19	32		RI			
2	FE21	28	I	DCD		RxD+	
	FE22	27	In	RXD#			
	FE23	26	Out	TXD#	TRxD+	TxD+	
	FE24	25		DTR			
	FE26	9		DSR		RxD-	
	FE27	8	Out	RTS			
	FE28	7	In	CTS	TRxD-	TxD-	
	FE29	6		RI			
3	FE31	1		DCD		RxD+	
	FE32	2	In	RXD#			
	FE33	3	Out	TXD#	TRxD+	TxD+	
	FE34	4		DTR			
	FE36	20		DSR		RxD-	
	FE37	21	Out	RTS			
	FE38	22	In	CTS	TRxD-	TxD-	
	FE39	23		RI			
	GND_DSUB	5		GND	GND	GND	
	GND_DSUB	14		GND	GND	GND	
	GND_DSUB	24		GND	GND	GND	
	GND_DSUB	33		GND	GND	GND	
	NC	19	NC	NC	NC	NC	
		38		Shield			
		39		Shield			

2.3.2. Front Panel Adapter Cable 37-Pin to 4x 9-Pin

A four-channel front panel adapter cable connects to the 37-pin D-Sub front panel connector and terminates on the user side with four, male, 9-pin, D-Sub connectors (one connector per serial I/O channel). The following table shows the pin assignment of the four 9-pin D-Sub connectors.

NOTICE

Do not connect external wiring to connector pins labeled with NC. Failure to comply may result in damage to your board.

Table 7: 9-Pin D-Sub Front Panel Connector Pin Assignment

D-Sub Pin #	RS232	RS422 Full Duplex	RS485 Half Duplex
1	DCD	RxD+	NC
2	RxD	NC	NC
3	TxD	TxD+	TRxD+
4	DTR	NC	NC
5	GND	GND	GND
6	DSR	RxD-	NC
7	RTS	NC	NC
8	CTS	TxD-	TRxD-
9	RI	NC	NC

2.3.3. JTAG Connector

The CPLD is pre-programmed using the 12-pin male dual row JTAG/ISP connector, during the manufacturing process.

2.3.4. CompactPCI Connector

The CPCI connector (J1) is located at the rear of the CP348. For information regarding the pin assignment of the CPCI connector, refer to the CompactPCI Specification.

3/ Configuration

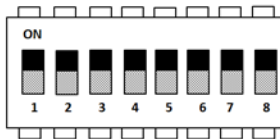
3.1. Hardware Configuration

The serial communication channels can be hardware or software configured for various operation types. The four serial I/O channels are independent and can be configured individually for RS232, RS422 or RS485 serial communication by setting an 8-port DIP switch or using jumper/resistor assembly.

3.1.1. Serial Mode Configuration

The CP348 offers the possibility to configure each channel with an eight-port DIP switch (SW1). Each channel can be configured separately using two dedicated switches. The switches are implemented as GND switches.

Figure 5: 8-port DIP Switch (default position – switches off)



Additionally, the CP348 offers the possibility to configure each channel with eight 0 Ω resistors (R35 to R28). Each channel can be configured separately using two dedicated resistors.

The DIP switch and the resistor option are wired 'OR' and it is possible to use both options. The following table shows the switch setting, 'On' or 'Off' and resistor setting 'Open' or 'Set', where 'Open' means a 0 Ω resistor is not assembled and 'Set' means an assembled 0 Ω resistor. A switch that is 'On' or a resistor that is 'Set', always has the higher priority.

Table 8: Serial Mode DIP Switch CP348 Configuration

Channel#	Channel 0		Channel 1		Channel 2		Channel 3	
Switch #	1/ R35	2 /R34	3 /R33	4 /R32	5 /R31	6 /R30	7 /R29	8 /R28
RS232	Off/Open	Off/Open	Off/Open	Off/Open	Off/Open	Off/Open	Off/Open	Off/Open
RS422 (full duplex)	Off/Open	On/Set	Off/Open	On/Set	Off/Open	On/Set	Off/Open	On/Set
RS485 (half duplex) with local echo	On/Set	Off/Open	On/Set	Off/Open	On/Set	Off/Open	On/Set	Off/Open
RS485 (half duplex) without local echo	On/Set	On/Set	On/Set	On/Set	On/Set	On/Set	On/Set	On/Set

3.1.2. RS422/RS485 Termination Jumpers

The CP348 offers the possibility to terminate the differential line pair when the serial channel is a beginning or end node. To enable the 120 Ω termination resistors, set the corresponding solder-jumper (JP1-JP8), by connecting the jumper pads using a tin bridge or adding a 0 Ω resistor.

Table 9: RS422/RS485 Termination Jumper Settings

Mode	Channel 0	Channel 1	Channel 2	Channel 3	RS422/485 Mode Options
Full duplex	JP7	JP6	JP3	JP2	120 Ω between TxD+ & TxD- lines enabled
	JP8	JP5	JP4	JP1	120 Ω between RxD+ & RxD- lines enabled
Half duplex	JP7	JP6	JP3	JP2	120 Ω between TRxD+ & TRxD- lines enabled

3.1.3. Handshake Control in Half Duplex RS485 Mode

In the two-wire half duplex RS485 mode, a handshake mechanism is necessary to prevent sending and receiving data over the same RS485 cabling at the same time.

The handshake mechanism manages the driver enable (DE) and receiver enable (RE) signals of the RS422/RS485 transceivers. The CPLD logic receives the 'RTS#' or 'DTR#' signals from the serial controller and generates the 'DE' and 'RE' transceiver outputs signals. The auto RS485 feature enables either 'RTS#' or 'DTR#' outputs signals, to control the RS485 enable input.

The CP348 'RTS#' or 'DTR#' control signal to the CPLD are configurable through resistor assembly. For more information on the required resistor configuration, see the table below, where 'Open' means a 0 Ω resistor is not assembled and 'Set' means an assembled 0 Ω resistor.

Table 10: RS485 Transceiver Control (RTS# and DTR#) Resistor Configuration

Channel	Channel 0		Channel 1		Channel 2		Channel 3	
Resistor #	R58	R59	R82	R81	R76	R83	R73	R64
RTS# Signal Controls DE/RE (default)	Open	Set	Open	Set	Open	Set	Open	Set
DTR# Signal Controls DE/RE#	Set	Open	Set	Open	Set	Open	Set	Open

When RS485 mode is selected with local echo, the receiver 'RE' signal is always 'Low' and without local echo the 'RE' signal is always 'High'. With local echo, the internal receiver is always activated and the RS422/RS485 transceivers receive transmitted signals instantaneously. Without local echo, to receive data the receiver is activated and the transmitter is deactivated, and to send data the transmitter is activated and the receiver is deactivated.



Default configuration (RTS#) must not be changed when using the OS drivers provided by Kontron.

3.2. Software Configuration

Configure as required using the drivers for Windows®, Linux® or VxWorks®. For more detailed driver information and installation instructions, refer to the relevant CP348 driver documentation included in the Board Support Packages (BSPs)



For driver information and BSPs, refer to the [Kontron's Customer Section](#)

4/ Installation

This installation chapter provides guidelines on positioning, installing and removing the CP348 board in a CPCI system with backplane slots.

4.1. Hardware Installation

Before installing the CP348 in a CPCI system's backplane slot ensure that the board's four serial I/O channels have been configured as required (RS232, RS422 full duplex or RS485 half duplex) by setting the 8-port DIP switch or jumper/resistor assembly, see Chapter 3.1: Hardware Configuration.



ESD Sensitive Device!

This CPCI board contains electrostatic sensitive devices. Observe the necessary precautions to avoid damage to your board:

- Discharge your clothing before touching the assembly.
 - Discharge tools before use.
 - Do not touch components, connector pins or traces.
 - If working at an anti-static workbench, use the professional discharging equipment.
-

4.1.1. Location in a CompactPCI Backplane

It is possible to install the CP348 in any CPCI backplane slot, with the exception of the CPCI system's master slot. When placing the board in a CPCI system consider the board's backplane location carefully. Factors such as the number of additional CPCI boards, their location in the system, and the operating system in use, may cause applications to have difficulty identifying boards properly.

If the board's position on the CPCI backplane is changed, a board replacement made, or other possible configuration changes are made to the initial system, verify the proper operation of the system (such as boards identified properly) before putting the system into operation.



Install all CPCI boards in the system prior to installing drivers or other board related software. Failure to do so may result in non-identification of given board(s) and improper operation of the CPCI system.

4.1.2. Hot Swap Capabilities

The CP348 is not hot swappable. Before installing or removing the CP348 from a CPCI system, turn off the CPCI system power and follow the installation procedures described in Chapter 4.2: Installation Procedure.

CAUTION

Not Hot Swappable

Before installing the CP348 in a CPCI system, turn off the CPCI system power. Failure to do so may result in personal injury and damage the CP348 or other board(s) in the CPCI system.

4.2. Installation Procedure

Before installing the CP348 in a CPCI system, read and observe the safety instruction within this user guide and ensure the board has been configured as required.

NOTICE

Failure to comply with the instructions in this chapter may damage the CP348 or other board(s) in the CPCI system.

To install the CP348 board in a CPCI system, proceed as follows:

1. Turn off all power to the CPCI system.

NOTICE

Do not push the CP348 into the backplane slot's connectors.
Use the ejector handles to seat the board properly into the backplane slot.

2. Insert the board into the designated slot carefully until it makes contact with the backplane connectors.
3. Use the ejector handle to engage the board with the backplane. The board is engaged when the ejector handle is locked.
4. Secure the board's front panel to the chassis with retaining screws, to avoid loosening of the board through vibration and to provide an earth connection.
5. Connect all external interfacing cables to the board, as required.
6. Ensure that the board and interfacing cables are secured properly.
7. Turn on power to the CPCI system.

NOTICE

The CP348 is only safely secured when the front panel is fastened to the CPCI chassis.
Secure the board to avoid loosening due to vibration and to ensure an earth connection.

4.3. Removal Procedure

Before removing the CP348 from a CPCI system read and observe the safety instruction within this user guide.

NOTICE

Failure to comply with the instructions in this chapter may damage the CP348 or other board(s) in the CPCI system.

To remove the CP348 board from a CPCI system, proceed as follows:

1. Turn off all power to the CPCI system.
2. Disconnect any interfacing cables connected to the board.
3. Unscrew the front panel retaining screws.
4. Disengage the board from the backplane, by unlocking and pressing the board ejection handle until the board disengages and pull the board out of the slot carefully.
5. Store the board in proper packaging in an environment that complies with the board's storage environmental specification or dispose of the board in accordance with the laws and regulations within your region.

4.4. Cabling

4.4.1. Four-Channel Front Panel Adapter Cable

To provide separate serial I/O channels, connect the four-channel front panel adapter cable to the 37-pin D-Sub front panel connector. The four-channel front panel adapter terminates on the user side with four male 9-pin D-Sub connectors for channels 0 to 3.

Table 11: Four-Channel Adapter cable

Part Name	Description
CP-ADAP-CP34X	Adapter cable serial port, D-Sub37 to 4x D-Sub-9 for CP348

The following table shows the relationship between channel number and port number.

Table 12: Four-Channel Front Panel Adapter Port Number

Channel #	Port #	Numbering (Port to Channel)
0	Port 1	
1	Port 2	
2	Port 3	
3	Port 4	



The D-Sub connector's port labelling differs to channel numbering on the CP348.

4.4.2. Null Modem Cable

If operating in RS232 mode, use a null-modem cable to enable the use of a terminal program. The null-modem cable links the adapter interface with the PC interface via a 9-pin female D-Sub connector.

4.5. Software Installation

Drivers for Windows®, Linux®, and VxWorks® are available for the CP348. For more detailed driver installation information, refer to the relevant CP348 driver documentation in [Kontron's Customer Section](#). For more information, contact [Kontron Support](#).



Install all CompactPCI boards in the system prior to installing drivers or other board related software. Failure to do so may result in the non-identification of given board(s) and improper operation of the CPCI system.

List of Acronyms

CE	Conformité Européenne
CPCI	Compact-PCI
CPLD	Complex Programmable Logic Device
CTS	Clear To Send
DE	Driver Enable
DIP	Dual In-line Package
DSR	Data Set Ready
DTR	Data Terminal Ready
EEPROM	electrically erasable programmable read-only memory
EMC	Electromagnetic compatibility
FIFO	First In First Out
HPM	PICMG Hardware Platform Management specification family

JTAG	Joint Test Action Group
LED	Light-Emitting Diode
ISP	In-System Programming
OSI	Open System Interconnection
PCI	Peripheral Component Interface
PCIe	PCI-Express
PECI	Platform Environment Control Interface
PICMG®	PCI Industrial Computer Manufacturers Group
RE	Receiver Enable
RTS	Request To Send
TTL	Transistor Transistor Logic
UART	Universal Asynchronous Receiver Transmitter



About Kontron – Member of the S&T Group

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). As part of the S&T technology group, Kontron offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through combined portfolio of hardware, software and services. With its standard and customized products base on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: <http://www.kontron.com/>



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